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A REVIEW OF THE WATERWAY PROBLEM

BY

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The agitaton of waterways has been so persistent during the last few years, so much has been said and published and so many phases of the question have been disclosed, that our national waterway problem is in danger of being embarrassed, not by too much data, but by too many opinions. It is well for the findings of the numerous committees to be presented, apart from formal reports, and to this end a review of the following recently published documents on our waterways is undertaken:

A. Preliminary Report of the Inland Waterways Commission. Government Printing Office. 1908.

B. Report of the Commissioner of Corporations on Transportation by Water in the United States. 3 volumes. Government Printing Office. 1909.

C. Report by a Special Board of Engineers on Survey of Mississippi River. Government Printing Office. 1909.

D. Report of the Mississippi River Commission. Government Printing Office. 1909.

E. Transportation by Water. Census Bureau. Government Printing Office. 1908.

F. Report of the National Conservation Commission. Government Printing Office. 1909.

G. Preliminary Report of the United States National Waterways Commission. Government Printing Office. 1910.

For over twenty years our waterways, and especially the Mississippi courses, have shown a constantly decreasing volume of trade. On the other hand, the reports of the railroads of the country have detailed an enormous increase of traffic, so much, in fact, that our railroads in times of bountiful production have not been equal to the demands of the areas which they serve. At St. Louis, the total amount of freight in tons received from railroads during 1908 was 23,577,922, and from the river 293,180, or a little more than one per cent. of the importation was by river lines (C. 351). The city is entered by twenty-nine lines of railroads, directly or indirectly, and it is the converging point of a river system that spreads over the whole interior basin of the United States. Antwerp, Belgium, on the other hand, receives twice as much freight from the waterways as from railroads. New Orleans, with a population of 290,000 and situated 106 miles from open water, compared with the ports of Hamburg, with a population of 850,000 and located 160 miles from the sea, and Antwerp, with a population of 400,000 and 55 miles from the sea, makes a poor showing for a waterway town. The entrances to these ports are practically alike by means of a 26-foot waterway of ample width. New Orleans' export and import trade amounted, during 1908, to 3,500,000 tons, of which 1,400,000 tons were in coal from up the river; Hamburg imported goods to the amount of 11,000,000 tons, and Antwerp imported over 9,400,000 tons; the American city sent less than five per cent. of the total tonnage of trade (160,000) tons up the valley, the German city sent seventy-three per cent. (8,000,000) tons of the import up the Elbe, and the Belgian city, eighty per cent. (7,500,000 tons) of its imports up the Scheldt (C. 350). Hamburg has in the hinterland 7,500 miles of rivers and canals of less than eight feet depth, Antwerp has 1,200 less than ten feet, while there is a possible 13,000 miles of waterway open to navigation down to six feet, at various degrees of efficiency, inland from New Orleans.

It is necessary to warn readers that German and Belgian trade statistics are not fairly comparable with those of the southern part of the United States. Many circumstances make quite different conditions. The geographic location of New Orleans is not favorable for trade. It is somewhat apart from the great traffic lines, while Antwerp and Hamburg are in part termini of the heaviest freight traffic highway in the world. Again, New Orleans does not have a dense population in the inland region abutting the rivers. The area (29,620 square miles) adjoining the Mississippi River from St. Louis to New Orleans has about 2,046,000 inhabitants, which makes a population of 76 per square mile including the cities, or about 38 per square mile outside of the cities, and the seven States adjoining the lower Mississippi has a density of population of 46, which rather sparse population gives little opportunity for local commerce. Belgium has a density of population of 620, and Germany of 290. The seven Mississippi River States, Illinois, Missouri, Kentucky, Tennessee, Arkansas, Mississippi and Louisiana, together have about one-fourth the total population, seven-fourths the area, one-seventh the density and eight-sevenths the total railroad mileage of Germany alone (C. 324). In the third place, the United States is largely developed by railroads. This is in part the result of the extensive domain which contains areas of great productivity, separated from each other by rather long journeys. Moreover, many areas of this country comparable in possibilities with the densely populated regions of Europe, contain a comparatively sparse population. Thus the southeastern portion of the United States if "settled like the New England State of Massachusetts, would contain 40,000,000 of people; if like Saxony, it would hold 20,000,000 more than the present total population of the United States; area for area it has resources of all kinds several times greater than those of Saxony."

The development of the United States by railroads is also in part due to the topography of the United States, which, unlike European countries, has no dominant natural central or longitudinal strategic vantage ground, but is somewhat separated in diverse physiographic provinces. New England's manufacturing plants have been located far from the raw materials, the major part of the food of the operatives is brought from a distance, the coal for warmth and power comes from without its borders and, in general, rapid and persistent transportation is necessary in order to maintain the standard of its output. Certainly, if the demand for rapid transit obtains in a country of tremendous magnitude and in a land where manufacturing plants are established and highly developed in scattered and somewhat in topographically remote places, there can be no great development of transportation by water. The great basins of our large rivers are not the most highly populated regions of the United States as they are in other regions of the world, and this in any waterway consideration is a vital point. In years to come, the alluvial basin of the Mississippi River may support a dense population and then the development of the waterway will be a natural and easily obtainable project; until then there must, to some degree, be given to the steamship companies the assurance of protective measures. If we eliminate, in considering European waterways, the factors which represent a difference mostly of historical status, and which stand to-day as a difference of density of population, of stability of population, of habits of trade, of priority in highway rights, and of relationship between railways and waterways, there will be found some encouragement for the future of our own waterways development.

The decline in the Mississippi River traffic in twenty years has been large. The official figures give for the Upper Mississippi a decline of 71.9 per cent.; the Ohio, 3.6 per cent., and the Lower Mississippi, 59.1 per cent. At St. Louis, the water shipments fell from a total of 600,000 tons in 1890 to 89,000 tons in 1906, while the railroad shipments increased from 5,000,000 tons in 1890 to 17,000,000 tons in 1906 (B, II, XXIII). Instance after instance may be specified. There is no doubt about the fact of the decline, consequently the discussion to-day accepts it and turns to the proposals of remedies. The result of all this investigation is an increasing interest in waterways generally and in the specific problem of the Mississippi. The unbiased presentation of the causes of the decline in traffic is necessary in order to know where to apply the remedial agents. These causes lie probably about as follows:

1. In the river itself.
   - A. The unreliability of the depth of water.
2. In the nature of the carrier.
   - B. The river boats have not improved in fifty years.
   - C. The terminals and systems of unloading and loading have not improved.
3. In the character of the commerce.
   - D. It is restricted to the movement of freight between river points only.
   - E. It is necessary to transship goods.
4. In the competition.
   - F. Railroads are allowed to compete with river lines and at times their methods are questionable.
   - G. River lines have burdens of insurance, wharfage charges, and the like to sustain.

A. The unreliability of the river.

The cry for a 14-foot channel along the Mississippi River, connecting the Great Lakes with the Gulf, arose in 1902, and has persisted. The Report of the Special Board of Engineers should in a great degree silence this demand and aid us in turning our energies towards more suitable projects. The Board investigated seven methods, all of them possible, of maintaining a 14-foot channel and estimated the amount of work necessary to be done, the first cost and the annual cost of operating and maintaining the plant.

These methods are by dredging, regularization, canalization with movable dams, canalization with fixed dams, lateral canals, reservoirs and a combination of methods. Only two of these are considered here.

1. Reservoirs. This system for improving the Mississippi River has strong advocates and as strong opponents. The discussion on the merits and failures of this plan has been at times heated. Reservoirs for the impounding of the excess of water during flood time and for supplying the low stages with enough water for navigation were advocated early in the history of the improvement of the river. Throughout all the discussion, opposition to reservoirs has been strong

enough to prevent much experimentation along this line. There has been established, however, north of St. Paul on the Mississippi River a system of five reservoirs covering, in total, 480 square miles. While the original recommendation included more reservoirs in this system, it has been impossible to obtain the requisite appropriation from Congress. The Board, after an examination of the effects of this system of reservoirs, which they state is the largest system of artificial reservoirs in the world, does not believe that any extension of its application to the Mississippi River below St. Louis will be attended with any approach to the desired result, and furthermore, that the cost of installing the system would be incommensurate with the benefits to be derived. The arguments against the reservoirs are:

a. With reservoirs at the headwaters of the tributaries, it would be impossible to forecast the time of discharge in order to benefit the low water stage. The effect of a flow from the above system cannot be felt in St. Louis within a two-month interval after the discharge begins. This interval is too long in a river where the drop in stage is neither regular in time nor in degree.

b. The storage reservoirs of the International Waterways Commission on the various tributaries have a capacity of 540 billion cubit feet. Arguing from the effects of the Mississippi system, the Board concludes that the "rise of the river bed indicates that the maximum of 540 billion cubit feet total storage, which might be obtained by reservoirs in the Mississippi River Basin from the Illinois River upward, could not maintain throughout the year more than eight feet available depth between St. Louis and Cairo, the increased discharge from the reservoirs tending to create a wider channel rather than a deeper one, and being useful, therefore, only as an auxiliary to other methods of improvements. To hold the water stage at St. Louis at 22 feet, the stage corresponding to a controlling depth of 14 feet between St. Louis and Cairo, would require over 5,000 billion cubic feet annual storage, or about ten times what has yet been found possible." This is practically the attitude of the Mississippi River Commission.

Before the days of the Mississippi River Commission, Ellet proposed a series of reservoirs for the tributaries of the Ohio to impound enough water, not only to reduce the flood height, but also to supply water during the low water stages. Leighton's scheme* does not differ in kind from Ellet's. In the plan before us to-day, 100 reservoirs with an enormous capacity and with a much broader distribution are provided. The objections made to Ellet's plans were in the

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*W. A. Dupuy. Handling the Rivers of the Nation. *World's Work.* March, 1908. 10011.

main in two lines, that the reservoirs would have to be located on valuable sites and that the effective handling of the impounded waters would be an almost impossible task. Leighton's plan must also be open to the same objection, but the salve has been administered for the great financial outlay by a promise of great dividends from the water power. "A purely nominal rental would be ample enough to repay in two or three decades the entire original expense of the system, besides a good income on the investment." Enthusiasts for reservoirs see all the ills that rivers are heir to cured by this system. "The proper building of reservoirs in the headwaters, therefore, offers what no other plan can possibly offer: it promises effective regulation of river stages and water supply for all time to come, removing entirely the liability of destructive floods, checking the erosion of banks and preventing much of the formation and shifting of sand bars and the pollution of water which the presence of sediment means."*

2. The Board commits itself to the recommendation of the continuation of the works of partial regularization of the stretch of the river from St. Louis to Cairo which will yield an eight-foot channel and then to obtain the fourteen feet by dredging; and south of Cairo, of the protection of the existing banks and of dredging. This is largely the policy of the Mississippi River Commission to-day. The recommendations of these two commissions could not be expected to vary in any degree, inasmuch as three out of five members of the Board are also members of the Commission.

The Board's most reasonable recommendation, however, is the abandonment of the fourteen-foot waterway project on the ground that all the commerce of the valley, present and prospective, can be adequately carried by a nine-foot channel. In commenting on this report Congressman Kunsterman of Wisconsin detailed the situation on European rivers with the text "that over in Europe the boats are made to conform to the existing river channels, while here we want to dig channels to conform to the needs of deep-draft ships."† The same speech contained the statement that the Rhine, with an average depth of six feet, carries an annual tonnage of twenty million; the Elbe, with a four and one-half foot average, eight and one-half million, and the Volga, with an eight-foot average, carries fourteen million. This recommendation against the fourteen-foot waterway is, perhaps, the most important turn which has occurred to our waterway affairs during the last few years. The survey for a fourteen-foot waterway was provided for by the River and Harbor Act of June, 1902, from the mouth of the Illinois River, via the Mississippi, to St. Louis, in connection with a fourteen-foot waterway from Lockport, Ill., to St. Louis. Such a waterway between the Lakes and the Gulf would have been a burden, and the outlay for construction and maintenance unnecessary. The Secretary of the Mississippi Valley Transportation Company, in a recent speech, describes the boats which that company has designed for the Mississippi River. The boats are 350 feet long, 50 feet wide and 10 feet deep in the hull; they will float in fifteen inches of water; 600 tons gives them a draft of three feet; 1,200, four feet; 2,200, six feet, and 4,000, nine feet. A thirty-inch navigable depth on the Oder River in Germany sustains three and one-half millions tons of freight annually. Large boats of the coastwise pattern or Lake type could not navigate the tortuous course of the river, even if these would float in a fourteen-foot channel. The idea of seagoing vessels sailing from Chicago via the Mississippi River is preposterous.

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* W. S. Tower. The Mississippi River Problem. *Pop. Sci. Monthly.* LXXIII, 26 July, 1908.

† *Cong. Record*, 61st Congress, 2nd Session. 45, 2019.

The Mississippi River Commission has been remarkably successful in maintaining a nine-foot channel south of Cairo. During the low water season of 1908 (E. 2646), under the stress of an unusually low stage of long duration, considerable effort was required to keep the crossing open. A number of the crossings had less than the required depth before the arrival of the dredges. At one crossing there was only six feet of water, but this was increased easily to nine feet. Four other sections were recorded with a depth from seven to eight feet. It is fair to add that three dredges were withdrawn from the regular service during the season to perform experimental dredging under another project. The river during the low water stages has been in very good condition for navigation, and the unreliability of previous years has to a large degree disappeared, but the river cannot be said to be entirely trustworthy. The sense of uncertainty has been kept alive by the departures from the stage of nine feet set by the Commission as a minimum.

B. The river boats have not improved in fifty years. The flat bottom stern-wheeler is and has been the prevailing type of steamboat on the Mississippi (E. 171). These in 1906 comprised 69 per cent. of the number and 74 per cent. of the gross tonnage of steam vessels. About six per cent. of the number with a gross tonnage of nineteen per cent. were side wheelers, which were employed in freight and passenger and ferry service. Less than one per cent. in number and in tonnage were center wheelers used for ferry service, and twenty-five per cent. were of the screw propeller class, but these carried only six per cent. of the total tonnage. Much local traffic is carried by gasoline boats under fifteen tons which are not subject to official inspection. In addition to self-propelled boats, there are many barges used as bulk carriers. These unrigged craft constitute on the Mississippi system 85 per cent. of the total number of vessels and 96 per cent. of the total vessel tonnage. Most of these are engaged in the coal trade on the Ohio.

While there has been a betterment in the bulk carriers, which is largely limited to coal and the gradual displacement of the old wooden barges by steel ones is now going on, and while, perhaps, the sternwheeler is the best sort of vessel for the river, the service, especially of the packet boats for freight and passengers, has been far from satisfactory. Certainly, the peddling of freight and passengers will not mean a large business: it is far different from being a regular carrier of the products of great industries. In the former case the load is accidental; in the latter traffic is sure and regular. "Freight cannot be carried by railroads in the main-line business in mixed trains which stop to pick up their cargo at the depot platform. How absurd it would be if the Pennsylvania Railroad should announce in the papers of the day that they would receive freight at the Union Depot, and that a train would come through about 4 o'clock and stop there while the freight was trucked aboard; and if they should add to this announcement the fact that this train would take passengers for New York! It sounds laughable, but it is no more laughable than any one of the announcements in the papers of New Orleans, Memphis, Vicksburg or St. Louis, or any one of a hundred other cities, every day of the year, that the magnificent new steamboat Centurion will receive freight and passengers to depart at 4 o'clock at the levee to-day, for Greenville and the Bends, or whereever she may be headed for."*

C. The terminals and systems of loading and unloading have not improved. The landing on the Mississippi River is a location near an undercut bank, where the vessel can be forced near enough to the shore for a gangway to be lowered. This means has a certain advantage from the standpoint of expense, unless the amount of goods be large, but it is very profligate of expense if a through boat attempts to stop at all the landings. In the case of a purely local traffic between farms and plantations, no odium can be attached to it. The reports of the numerous boards which have investigated the traffic of the Mississippi state that the terminals at the larger river ports are in a backward state. In general, the indictment is that, at many points, there has been but little improvement of the natural banks and, at many more points, there has been a dearth of mechanical devices for handling freight, and at some points, owing to the variations of the stage of the river, floating freight sheds are used from which the freight is laboriously dragged up the levee (B. III, 202). The lack of loading and unloading facilities increases the cost of operating when the tonnage is large, by increasing the size of the crews, consequently Mississippi River steamboat crews are larger than those of the coastwise and lake traffic (E. 177). For the coastwise service, the average is one man for every 42 tons of gross tonnage; for the Lakes, the average is one man for every 107 tons, while on the Mississippi River it is one man for every 8 tons. In contrast with all other traffic, the coal traffic of the river system ought to be considered. Coal, sand and stone constitute 86.9 per cent. of all the barge freight of the river (E. 183), and these commodities on specific rivers, as the Ohio, form 91.6 per cent., and the lower Mississippi 46.5 per cent. At the Port of Pittsburg coal constituted 75 per cent. of the total commerce; at New Orleans, about 1,200,000 tons of coal is received by river shipments. There has been an important increase in the coal traffic, especially of the Monongahela River. This coal traffic is largely owing to the enterprise of the Monongahela River Consolidated Coal and Coke Company. The terminals of this company are similar to all great port terminals, and are in strong contrast to the terminals used generally on the river. This comparison leads a Congressman, in consideration of the River and Harbor Bill, to say "that with proper equipment for river navigation we can do as well and better (than in Europe) in the United States is evident from the fact that coal is shipped from Pittsburg to New Orleans in barges of eight feet draft at three hundred and seventy-six one-thousandths of a cent per ton mile—a little over one-third of a cent per ton mile. The average ocean freight in ships of 21-foot draft is thirty-five one-hundredths of a cent per ton mile—just a trifle less than that shipped on barges on the Mississippi. Now, what enables the coal companies to ship coal on the Ohio and Mississippi Rivers at such low rates? Simply the fact that they have proper terminals and proper machinery to load and unload their coal at a minimum cost. I doubt whether the cost of transportation would be lessened the least part of a cent if the 14-foot project were carried out and barges of 12-foot draft, instead of 8 feet, be used. Certainly not a sufficient deduction in transportation would result to warrant the great expenditure of a 14-foot channel."*

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* American Forestry. XV, p. 34.

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* *Cong. Record* 45. 2019.

The rights of the water-fronts in the various cities of the valley are variously distributed, but in general they are to a large degree out of the public control. Thus Pittsburg has a river front of 30 miles; of this six and one-fourth miles are owned by the city, railroads own ten and five-eighths, and the railroads and industrial concerns occupy all the Ohio and Monongahela frontage except two and one-half miles. Cairo has six and one-half miles of river front; the city owns none; railroad lines occupy the frontage on both the Mississippi and Ohio Rivers, except a length of about twenty blocks. Memphis owns its entire frontage of five miles, but a part of the frontage is occupied by tracks (B. III, 228).

D. Freight is restricted to movement between river points only. The river line is to a large degree fixed in direction. It may or may not trend in the path of the greatest commercial activity; it may or may not connect areas yielding raw materials with areas of manufacturing advantages; areas yielding food products with areas of dense population; or regions of great industrial output with regions that might be a market. River lines, on the other hand, generally connect the interior with the coast, and this, in a country of limited area, is more apt to be the line of trade than in a country of wide expanse. Large cities are sometimes developed by railroads in locations apart from the waterways, and some of the cities, like Worcester, Mass., and Birmingham, Ala., are industrial and manufacturing centers of no small magnitude. In the history of transportation, canals and waterways preceded railroads. In densely settled countries, as Germany, where the resources are largely known, the location of waterways are in line of permanent trade, and because water transportation is cheaper than rail, these water routes have persisted and have been eminently successful. In a newer country, like the United States, where the center of population has been gradually shifting and where the line of great industrial movement has not become constant, waterways cannot have a development comparable with the railroads. This topic is further expanded under the following heading:

E. Transhipment is necessary. Two points are considered here: the impossibility of ocean or lake vessels using a river channel and the possibility of the use of waterways for a part of a long distance haul because of cheaper rates.

The type of vessel for lake or ocean traffic must necessarily be different from the type best adapted to river traffic. The storms to which the former are subjected increases the cost of building so that an ocean vessel costs about $71 for each ton carried; on the

Lakes, where storms are less violent, $41.50, while a tugboat and ten barges capable of transporting 10,000 tons of freight on an eight and one-half foot draft cost about $12 (C. 24). Besides the item of expense there is the question of limits of navigability due to the irregular course of a river highway and to the depth. It would never pay to straighten the river for ocean craft and, as it is, the long and narrow ocean and lake type could not navigate the bends with the rudder power only sufficient for open sailing. A fourteen-foot waterway would not yield depth enough for ocean and lake traffic. The tendency has been towards vessels of greater draft, and it is reported that but a comparatively small portion of the steamers of ocean commerce could use a fourteen-foot harbor.

It is apparent that much of the material for river shipment in the United States comes from or is destined for points not on the river. In the case of coal from Pittsburg, the bulk carriers are loaded directly from the mines and are loaded into the holds of ocean-going vessels at New Orleans with very little handling. Coal is the largest commodity carried on the river; it is bulky freight and ought to be carried by water at a cheaper rate than by rail, and the difference in the rates should be enough to give good interest on proper methods of handling the coal at the terminals. Yet during 1906, in a table compiled from the "Mineral Resources of the United States" (B, II, 256), there is shown that 37,000,000 tons of coal were shipped to and through Pittsburg, 12,000,000 to and 25,000,000 through. Of the 12,000,000 tons, 5,000,000 came by rail and 7,000,000 by water; of the 25,000,000 tons shipped through Pittsburg, 22,500,000 went by rail and only 2,500,000 tons, or about eleven per cent., was carried by river lines. The present traffic of the system is made up largely of commodities where the necessity of transshipment is slight, and includes forty per cent. of the total traffic in coal, twenty-five per cent. in logs, fourteen per cent. in stone and sand, five per cent. in package freight, and the remainder variously distributed with less than four per cent. in agricultural products. Very little traffic is done where the river is made a means of low rates as a part way of a long distance haul; and even in large centers, as Cincinnati, the river brings but a small per cent. (33) of the coal distributed to the district.

F. Competing lines of railroads and their methods. There are certain advantages accruing to railroads which arise from the nature of the carrier. These have been stated above in the negative way from the standpoint of water traffic, and they embrace the possibility of lines being built to any site with the promise of traffic, the great development of branch and shunt lines, the transference of products from one line to another without handling, the great development of the through-freight, and the concentration and high development of terminals at the most convenient locations. There are certain other advantages which the railroads have assumed through an unjust use of power which count against the river traffic, but which does not in the long run benefit the nation at large. These have been pointed out (G, 7) to be:

1. The power of the railroads to charge lower rates between points where there is competition by water routes and to make this up on lines devoid of competition. For example, Clarkesdale, inland, is 76.7 miles, and Friars Point, on the Mississippi River, is 70.1 miles from Memphis. The charge on first-class merchandise per hundred pounds from Clarkesdale was fifty-six cents; from Friars Point to Memphis, forty-five cents. The former town is 379 miles from New Orleans, and the latter 385,5 miles. The rate from Clarkesdale to New Orleans was seventy-two cents; from Friars Point to the same city, forty-five cents, and on the former line the charge on cotton was $2.25 per bale, on the latter, $1.00.*

It is asserted (A, 316) that while there has been a decline in the traffic of most commodities on the Mississippi River due to railroad competition, the shipment of lumber and coal has not suffered because the rate by boat is so cheap, as, for instance, coal from Pittsburg to New Orleans at a cost of less than two dollars per ton, or less than one mill per ton-mile, that the railroads cannot compete. It is quite generally the case that rates by water are lower than rates by rail, as; for instance, the rate in cents per hundred pounds from Pittsburg to Cincinnati by rail is 41 and by water 25 (A, 115). For the shipper, however, the rates are nearly equalized, because in water traffic there must be added the cost of insurance, as well as the extra charge of cartage.

2. The power of the railroads to buy steamboat lines, to force into bankruptcy competitive river lines by discriminating tariffs to monopolize wharf privileges, to block shipments by adverse placements of tracks and to run competitive lines of steamers. The extent of occupancy and ownership of water frontage on the Ohio and Mississippi rivers along the line of the greatest traffic of the system has been given for Pittsburg, Cairo and Memphis. J. C. Welliver writes (A, 388) that if the Ohio had been a German river, "The State would maintain that instead of building railroads to handle traffic which would as well be moved by river, it would

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* *Cong. Record*, 41. 2,427. 1907.

better leave this traffic to the river and spend its money building railroads in regions where it was impossible to furnish any but rail transportation."

3. The power of railroads to prevent partial transportation by water by the refusal to pro-rate. There is no doubt that if the railroads and steamship lines could be made to coöperate and could be hindered from competing, our waterway transportation problem would be another story. Numerous instances may be cited. It is reported (A, 330) that the steamship lines on the Ohio had pro-rating agreements with all railroad lines approaching the river. In 1900 these arrangements were terminated by the representative of the railroads. "Instead of being able to quote through rates as formerly, the packet lines are now obliged to quote their own rate to the point where they connect with the railroad, and then add the local tariff rate of the railroad from that point to destination" (A, 331). This loss of pro-rating agreements is supposed to have resulted from the undue influence of certain large corporations, and it has ruined the water traffic in such staples as are produced by these monopolies. On the other hand, a recent decision of the International Commerce Commission (B, I, 333) seems to infer that the Commission has the power to compel railroads to pro-rate with a steamboat line.

G. The burdens of insurance, wharfage charges, etc. Marine insurance affects shipping in two ways: there is the necessity of insurance of the vessel itself which is assumed by the company and the necessity of insurance of the merchandise which is assumed by the shipper. In the former case the rate is high because of the greater liability and because at a single time a great part of a steamship company's equipment is under the stress of danger and the loss of a single vessel may mean the failure of the company. In comparison with the railroads of the United States, which, during 1906, suffered a loss of only 1.3 per cent. of the total freight revenue, so small that it is covered by the operating expenses, the steamship companies are severely handicapped. And, furthermore, because shippers are obliged to insure their own bill of goods, the companies must make lower rates than the railroads in order to attract trade; thus the cost of insurance must be added to the freight rate in order to get the exact cost of transportation. From Vicksburg to New Orleans the freight rate on cotton is seventy cents per bale and the insurance is twenty cents, making a total cost of ninety-five cents.

Besides the premiums for insurance, many boats along the river have to pay terminal charges, such as dock rent, if the wharf is used, wharfage rent, and sometimes towage and pilotage costs. The wharfage charges are frequently so high as to discourage navigation. One river boat on the Ohio paid over $3,200 for landing charges, which was one-fourth the net profits of the boat (B, II, 35). The result is that the boats refuse to stop at certain points, and the traffic is turned over to the railroads. These charges are in the main intended to cover the cost of maintenance, but in many places the depreciation of the property is evident, and the charges approach the character of "hold-ups." When the charges for landing at public wharves equals or excels the entire amount of the freight rate received from the landing, as is frequently the case, there is no encouragement to vessel owners to receive small consignments, and package freight must disappear from the river.

The waterway problem has assumed large proportions. In the volumes reviewed there is much material not pertinent for printing in this place, but which is interesting and valuable. The question of power and water privileges from certain slack-water projects are considered at great length. That some of the recommendations contained within these volumes will be fought is indicated in the brief discussion of the Rivers and Harbors Appropriation Bill of this Sixty-first Congress, Third Session, when a member, speaking for the Lakes to the Gulf Deep Waterways Association, states that "The purpose of that convention (St. Louis) was to call the attention of Congress to the growing necessity of a 14-foot channel from the Lakes to the Gulf, and the convention went on record in its resolutions demanding that no less than 14 feet should be permitted and should be accepted,"* and caused to be read in Congress portions of these resolutions.

The subject has become an intricate one; it is pioneering into the unknown with little aid from the analogies drawn from other lands; but one can find encouragement, in the face of so much insistence from Boards of Trade and Waterway organizations, that the Committee of the Senate and House of Representatives advises that without a careful and unbiased examination of proposed improvements of the nature now required by statute no project should be adopted by Congress.

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* *Cong. Record*, 46. 178. Dec. 1910.